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**Red Hill AOC Section 8 Scoping Meeting
Risk and Vulnerability Assessment
August 30 – September 1, 2016
EPA Region 9 Offices, 75 Hawthorne Street, San Francisco**

Adobe Connect: [[HYPERLINK "http://epawebconferencing.acms.com/redhill/"\t "_blank"](http://epawebconferencing.acms.com/redhill/)]

Passcode:QRVA

Conference Line: xxx-xxx-xxxx Passcode:xxxxxxx

DAY 1 – PARTIES TO AOC ONLY

0900 - Kick Off Of Meetings (Linder)

- Introductions
- Recap of AOC Requirements
- Discussion of Risk Assessment Objectives
 - Why is Risk Assessment Important
 - What Will Make Risk Assessment Successful
 - Risk Assessment Role in Facility Improvement Decisions
 - Risk Assessment Role in Subsurface Characterization Decisions

0930 - 1000 - Risk Assessment Framing Presentation (Myers/Brooks)

1000 – 1100 – Risk Assessment Big Picture Considerations

- Discussion of Risk Assessment Stakeholders
 - Parties to the Agreement
 - Navy/DLA
 - Contractors
 - Regulatory Agencies
 - External SMEs
 - Public
 - Elected Officials
- Discussion of History of Risk Assessment/Risk Characterization/Risk Communication re: Red Hill
 - Informal Assessments Done that Triggered Upgrades
 - Groundwater Protection Assessments
 - Assessments Done by Third Parties
 - What is Currently Unknown or Not Well Understood
- Opportunities for Stakeholder Input
- Communicating Results of the Risk Assessment

1100 – 1115 - Break

1115 – 1145 – ABS Overview of Quantitative Methods for Assessing Failure Risk (Liming)

Commented [S01]: I think we need to treat this carefully. I am also not sure what level of involvement you are thinking. We should be prepared to propose some compelling strategies for input depending on your ideas. Input can be valuable, but it can slow things down tremendously

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1145 – 1330 - Scenario Examples (Lunch will be brought in)

- DISCUSSION - Walk-Thru of Assessing Risk on Examples of Failure Modes
 - Corrosion Hole in Tank Barrel
 - Fracture of Bottom Nozzle in Lower Tunnel

1330 – 1345 Break

1345 - 1530 - Discussion of Approach to Quantitative Failure Mode Risk Assessment

- Assessing Infrastructure Failure Modes Utilizing Quantitative Risk Assessment (QRA)
 - Overview of Methodologies
 - Quantitative Methodology
 - Other Methods that Should Be Considered For Portions
 - Semi-Quantitative
 - Qualitative
 - Boundaries of Assessment
 - Establishing Input Parameters
 - Utilizing Past Information
 - Assessing Quality/Validity of Past Information
 - Discussion of How Bayesian Methods Will Be Applied
 - Utilizing Information from Other AOC Tasks
 - Inspection, Repair, and Maintenance Reliability
 - Corrosion Rate
 - Destructive Testing
 - Release Detection
 - Discussion of What Should Be Out of Scope
 - Failure Modes
 - Initiating Events
 - Presentation of Results from Infrastructure QRVA

Commented [S02]: I really think we would benefit by going through an example more towards the middle of the discussion instead of the end. I think we can tend to get into these unproductive existential arguments with Navy especially over the risk assessment. They should run through two examples, we give our impressions and then they can pull back into an overview of methodologies and such. Of the two examples: one can be what we believe should be quantitative and another one can be what we believe a priori should be semi-quantitative

Commented [S03]: Is this for this current assessment or future updates?

Commented [S04]: How are boundaries different than out of scope? Did you mean geographic boundaries above?

1530 – 1550 - Break

1550 - 1650 - Discussion of How Quantitative Failure Mode Risk Assessment Will Inform Exposure Risk Assessment

- Characterizing Groundwater and Drinking Water Impact for Infrastructure Failure Modes
 - Establishing Range of Source Terms for Range of Failure Modes
 - Magnitude
 - Location
 - Geometry
 - Estimating Mass Flux to Groundwater from Source Terms
 - Modeling Fate, Transport, and Transformation of Released Product in Groundwater System
 - Contaminants of Concern
 - Receptors

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1650 – 1700 Wrap-up Day 1

Day 2 Morning – Parties to AOC Only

0900 – 0915 – Opening Thoughts

0915 - 1015 Discussion of Alternative Location Assessment (Navy)

- Options for Evaluation
- Evaluation Approach
- Evaluation Presentation

1015 – 1115 Risk Management and Overall Project Management Considerations

- Assessing "Costs" Related to Failure Modes
 - Groundwater Damage
 - Reputation
 - Other
- Project Management Considerations
 - Interim Deliverables
 - Dovetailing Work on Other AOC tasks with Risk Assessment
 - Key Decision Points in the Overall Schedule and Role of Risk Assessment
 - Communications

1115– 1125 Break

1125 – 1245- Discussion of Agenda for Part 2 of Meetings with External SMEs

Topics for Discussion with External Subject Matter Experts – BWS

- External SME's Role in the Risk Assessment Process for Red Hill
- Official Use Only Information
- Acknowledgement of their Red Hill Resolution
- Their Vision of Acceptable Risk
- Contaminants of Concern
- Recap of the BWS May 27th Comments Related to Risk Assessment
 - 1) Defining Acceptable Risk Levels
 - 2) Evaluation of As-Is vs. Improved
 - 3) Seismic
 - 4) Utilization of All Available Information
 - 5) Considerations Related to Ability to Detect and Mitigate Risk
 - 6) Sensitivity Analysis
 - 7) Maximize Failure Scenarios Analyzed
 - 8) Criteria for Selection of Failure Scenarios
 - 9) Cost of Aquifer Contamination
 - 10) Evaluating Downstream Risk of Groundwater Contamination
 - 11) Identifying Data Gaps

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- 12) Need for P&IDs
- 13) Independent Review of Assessment
- 14) How Fate and Transport will be Analyzed
- 15) Assessment of Current vs. Alternative Locations for Fuel Storage
- 16) Optimization of Risk Reduction Alternatives

Day 2 PM – PARTIES and External SMEs

1300 – 1315 Introductions

1315 – 1400 Discussion – Objective of Risk Assessment

- Acceptable Risk Levels
- Evaluation of As-Is vs Improved
- Cost of Aquifer Contamination
- Independent Review

1400 – 1445 Presentation – Overview of Proposed Approach for Conducting Risk Assessment

- Utilization of All Available Info
- Sensitivity Analysis
- Independent Review of Assessment
- Data Gaps

1445 - 1515 External SME's Role in Risk Assessment Process

- Unique Expertise
- Data
- Confidential Information

1515 – 1530 Break

1530 – 1620 Groundwater Considerations

- Discussion of Receptor Scenarios for Inclusion in Assessment
 - Existing Groundwater Production Points
 - Extraction Magnitude Range
 - Planned Groundwater Production Points
 - Probability of Construction
 - Extraction Range
 - Potential Groundwater Production Points
 - Probability of Construction
 - Extraction Range
- Discussion of Ideas Related to Evaluation of Assessment of Fate, Transport and Transformation
 - Estimating Migration of Source from Location of Release to Receptor

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- Source Terms
- Migration through unsaturated zone
- Migration in saturated zone
- NAPL Transport in/on top of aquifer
- Dissolved phase fate, transport, and transformation
- Evaluation of Downstream Risk of GW Contamination

1620 – 1655 Alternative Locations

1655 – 1700 Wrap-up Day 2

Day 3 AM – Parties to AOC and External SMEs

0900 – 0915 Opening Remarks

0915-1045 Quantitative Risk Assessment of Infrastructure

- Overview of QRVA Process Proposed
- Assessing Failure Points
 - P&IDs
- Failure Scenarios
 - Criteria for Selection of Failure Scenario
 - Screening out failure scenarios
 - Maximum to be Analyzed
 - Seismic

1045 – 1100 Break

1100 – 1215 Risk Management and Communication Discussion

- Considerations Related to Ability to Detect and Mitigate Risk
- Optimization of Risk Reduction Alternatives
- How Risk Assessment Should be Used to Inform Upgrade Decisions
- How To Communicate Risk with Stakeholders and Public

1215 Wrap Up

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READ AHEADS

Dan Brooks Presentation (pending)

Jim Liming Presentation (pending)

BWS May 27, 2016 Letter

BWS Red Hill Resolution

FAQs from BWS Website

Q: Why is the Board of Water Supply (BWS) so concerned about the Red Hill Bulk Fuel Storage Facility?

A: The Red Hill Bulk Fuel Facility contains 187 million gallons of fuel that is located just 100 feet above a State designated drinking water aquifer. The BWS uses water from this aquifer to serve residents from Moanalua to Hawaii Kai. Navy studies show the groundwater underneath the tanks is already contaminated with petroleum chemicals. These studies also document leaks dating back to 1947, the fuel tanks wearing from corrosion and the risk of a large catastrophic fuel release. If such a release occurred, it could pollute the aquifer and our water supply for many years.

Q: Why should I be concerned about Red Hill? I don't live near Red Hill or get water from wells in this area.

A: The situation at Red Hill poses a threat to existing Board of Water Supply (BWS) wells that are presently not contaminated. If these wells ever became contaminated or a catastrophic large volume of fuel got into the groundwater, then water rates would need to increase to pay for treatment to remove the contaminants from the water. If the situation involved a large release, the cost to treat would be so prohibitive as to render the wells and aquifer unusable for decades to come. The wells unaffected by the incident do not have the capacity to make up the difference resulting in long-term water moratoriums. Water rates would need to increase to pay for alternatives to take the place of the water loss. Since water rates apply to all BWS customers island wide, everyone would end up paying for what happens at Red Hill.

Q: How could the wells be contaminated by a fuel leak?

A: Fuel from the tanks that leak into the groundwater can eventually spread to neighboring wells because the groundwater is always moving. The amount of fuel that contaminates the aquifer and how quickly it spreads depends on the volume of fuel released into the groundwater. A large volume of fuel released into the groundwater due to a major pipe or tank failure will contaminate the groundwater much faster and over a larger area than fuel that is slowly leaking from the tanks.

Q: Are the Board of Water Supply (BWS) wells showing signs of contamination?

A: Not at this time. However, contamination is present in the groundwater underneath the tanks which can move in the groundwater and spread to neighboring wells in the area.

Q: What contaminants are being found in the groundwater and wells?

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A: Petroleum hydrocarbons and various related chemicals. Some of them include, total petroleum hydrocarbons as diesel (as called TPH-d), naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, toluene, benzene and lead.

Q: What would a worst case scenario look like?

A: A catastrophic fuel release could occur as the result of structural failure of the tanks caused by an earthquake. This could result in more than 1.2 million gallons of fuel released into the groundwater and 6.3 million gallons to Halawa Stream and Pearl Harbor.

Q: In such a scenario, what actions would BWS take?

A: The Board of Water Supply (BWS) would immediately shut down our Haliawa Shaft and Moanalua wells. The BWS would then impose a water moratorium in Honolulu. The Navy's Red Hill Shaft would also be shut down, creating a water shortage for Pearl Harbor. A large fuel leak would render the groundwater aquifer unfit for drinking for decades as treatment alternatives in such a scenario would be ineffective and costly.

Q: What is the Board of Water Supply (BWS) asking of the Navy?

A: The BWS wants the Navy to double-line the tanks, install more sensitive leak detection sensors in each tank, and clean up the petroleum contamination presently in the groundwater underneath the Red Hill fuel tanks.

Q: Are the tanks still leaking jet fuel?

A: Yes. Tests conducted by the Navy since 2005 continue to show petroleum contaminants present in the groundwater underneath Red Hill at levels that, in one case, has exceeded Hawaii State Department of Health (DOH) environmental action limits since 2005.

Q: Does the Board of Water Supply (BWS) have enforcement powers when it comes to protecting Oahu's water sources?

A: No. The Hawaii State Department of Health (DOH) has jurisdiction and regulates underground fuel tanks in Hawaii.

Q: What are the health effects of these chemicals in our water?

A: The Board of Water Supply (BWS) is conducting studies to determine the health significance of low level petroleum chemicals in drinking water.

Q: Are there any national environmental standards for underground fuel storage tanks?

A: Yes. There are federal and state regulations that apply to all underground storage tanks. However, Red Hill is a field-constructed underground tank that is deferred from many of the requirements that must be met by smaller facilities. In 2011, EPA proposed changes that would cancel Red Hill's exemption from the rules. The proposed changes are still pending.

Q: What can residents do to support the Board of Water Supply (BWS) in this endeavor?

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A: The BWS urges Oahu residents to join the BWS in its efforts to urge mitigation efforts by the Navy to further protect our groundwater and the environment. Residents may do this by:

- Read the proposed Administrative Order on Consent (AOC). A public meeting to discuss the AOC was held on June 18, 2015. Read the [HYPERLINK "https://remoteworkplacedr.epa.gov/bws/media/files/,DanaInfo=.awxyCftgylxp7m6s68.785HVzA.+red-hill-bws-testimony-at-aoc-public-meeting-2015-06-18.pdf" \h].
- Attend upcoming community meetings in your neighborhood about this issue and voice your concerns about protecting our groundwater resources.
- Help build awareness of this issue by sharing this webpage and FAQ with your family and friends.
- Contact your elected officials to let them know you are concerned about this issue and that you support efforts to protect Oahu's groundwater resources. For your convenience, we have listed the contact information for Hawaii's congressional delegation.